California Department of Veterans Affairs

NEWS FOR VETERANS

Contact: Robert Glazier
Jerry Jones
Jaime Arteaga
Legislation and Public Affairs
916-653-2192
Fax 916-653-2611
February 25, 2005

UNDERSTANDING HOW YOUR EAR WORKS WHEN YOU EXPERIENCE HEARING LOSS

By Alfred Menchaca
Texas Veterans Commission

If you are experiencing a gradual hearing loss, you may not realize just how much sound you are missing. You may feel frustrated because:

- You frequently have to ask people to repeat what they said.
- You find yourself saying "huh?" or "what?" when others speak to you, especially if there is any background noise around.
- It seems like other people just aren't speaking clearly.
- Family members get upset with you and say that, "you hear what you want to hear."
- Family members get upset with you because you turn the TV up too loud for them to enjoy it.

If these are the things you are experiencing, you have a hearing problem.

The most common type of hearing loss seen at the U.S. Department of Veterans Affairs (VA) is "sensorineural hearing loss." This is the same as "nerve-type hearing loss" or "nerve deafness." This is a permanent loss of hearing that is caused by damage to the nerve fibers or inner ear hair cells, where sound turned into nerve energy. This type of hearing loss is often the result of noise exposure or age. There is no medical or surgical treatment. A hearing aid is usually recommended, but it cannot restore damage nerve fibers or inner ear hair cells.

A second type of hearing loss is called "conductive hearing loss." Conductive hearing loss is caused by a problem with the mechanical part of the ear eardrum, the tiny bones in the ear, or the space behind the eardrum that contains the tiny bones. This kind of hearing loss may be treated, so you may be referred to an ear, nose, and throat doctor. If the mechanical problem is treatable, the treatment is attempted first. If you decide not to undergo treatment; if the treatment is unsuccessful; or, if you still have some hearing loss after treatment, your primary care provider may recommend a hearing aid.

A third type of hearing loss is a "mixed hearing loss." This means that there is both a sensorineural loss and a conductive loss in the same ear. Medical treatment is the first step, but a hearing aid may still be needed even if the treatment for the conductive part of the loss is completely successful.

How Your Ear Works

If you are getting to the point where you can't hear anymore or hearing things you are not supposed to, the following section will tell you how the ear works.

THE OUTER EAR: This is the ear we see on each side of our heads. It collects the sound waves around

us and funnels them into the ear canal to the eardrum. It helps us locate the source and direction of the sound. The outer foundation of the ear canal is cartilage covered with skin that contains hairs and glands that secrete wax. The hairs and wax (cerumen) help prevent foreign bodies, such as insects or dust, from entering the ear canal.

THE MIDDLE EAR: This part of the ear begins in the eardrum at the end of the ear canal. It contains three tiny bones, the hammer (malleus), anvil, and the stapes. These three bones together are called the ossicles. When sound waves hit the eardrum, it moves back and forth causing the ossicles to move. This changes the sound waves to vibrations. The middle ear has a tube called the eustachian tube that provides ventilation and access to outside air and equalizes air pressure on both sides of the eardrum - the middle ear side and the outer ear side. We feel the eustachian tube at work when we feel air pressure changing in our ears as we chew, yawn, or swallow.

THE INNER EAR: This part of the ear contains the sensory organs for hearing and balance. The cochlea is the hearing part of the inner ear. The semicircular canals, the utricle, and the saccule are the balance part of the inner ear. The vibration energy from the movement of the middle ear bones pushes the membrane (the oval widow) in the cochlea. This force moves the cochlea's fluids. This stimulates tiny nerve endings called hair cells. The hair cells change the vibrations into nerve impulses. The impulses travel to the brain through the acoustic nerve where they are understood as the sounds we recognize.

THE CENTRAL AUDITORY SYSTEM: This system processes the sound information as it is carried to the brain. It is responsible for all of the functions that determine how you hear and what you hear.

THE VESTIBULAR SYSTEM: Balance, or one's sense of equilibrium, is controlled through the vestibular system. The vestibular system uses information from many systems, hearing as well as vision and muscle feedback. It consists of three semicircular canals, the utricle, and the saccule. They all contain sensory hair cells that are activated by movement of inner ear fluid. As the head moves, hair cells in the semicircular canals send nerve impulses to the brain by way of the vestibule portion of the acoustic nerve. The semicircular canals provide information about the movement of the head; the sensory hair cells of the utricle and saccule provide information to the brain about the head position when it is not moving.

The causes of hearing loss in adults could be caused by:

- OTOSCLEROSIS - a disease involving the middle ear that affects the movement of one of the tiny bones in the middle ear.
- MENIERE'S - a disease that affects the membranous inner ear and results in deafness, dizziness (vertigo), and ringing in the ear (tinnitus).
- NOISE - exposure to harmful levels of noise results in noise-induced hearing loss. Prolonged exposure causes damage to the hair cells in the cochlea and results in permanent hearing loss. This type of hearing loss usually develops gradually and painlessly.
- TRAUMA - injury, especially fractures of the temporal bone, puncture of the eardrum by foreign objects, and sudden changes in air pressure can result in hearing loss.
- AGING - The aging process can cause a type of hearing loss called presbycussis. It involves degeneration of the inner ear (cochlea).

No hearing aid can restore normal hearing, but hearing aids can improve your ability to hear and understand what people are saying. Hearing aids work by amplifying sound.

For guidance on what you can do or see if you qualify for hearing aids through VA, contact the nearest VA Medical Center or your local County Veterans Service Office. You can find office locations and telephone numbers on our website at www.cdva.ca.gov or by calling 800-952.5626.
